I Claim:

1. An apparatus comprising:

a chamber, wherein said chamber has a gas inlet port; and

a rotor, wherein said rotor is disposed within said chamber, and wherein said rotor has a pivot point and a first end, and further wherein said rotor rotates about said pivot point in a direction that is substantially perpendicular to a flow of gas through said gas inlet port.

2. The apparatus of claim 1 wherein said chamber has a control volume port and a gas vent port, and wherein said chamber and said rotor collectively compose a first stage, and further comprising a second stage, wherein said second stage comprises:

a bore; and

a piston, wherein:

said piston is disposed within said bore;

a region of said cylinder between a bottom of said piston and a bottom of said bore defines a control volume; and

said control volume port is pneumatically coupled to said control volume.

3. The apparatus of claim 2 wherein said rotor rotates between a first position and a second position wherein:

in said first position, said rotor pneumatically couples said gas inlet port to said control volume; and

in said second position, said rotor pneumatically couples said control volume to said gas vent port.

4. The apparatus of claim 3 wherein said rotor rotates about 10 degrees or less between said first position and said second position.

5. The apparatus of claim 1 further comprising a nozzle, wherein said piston and bore are configured so that when said rotor is in said first position, said piston blocks access to said nozzle.

6. The apparatus of claim 5 further comprising a solid-fuel gas generator, wherein said solid-fuel gas generator generates said flow of gas.

7. An apparatus comprising:

a chamber, wherein said chamber has a gas inlet port; and

a rotor, wherein:

said rotor is disposed within said chamber;

said rotor has a first end and a second end;

said rotor has a pivot point disposed between said first end and said second end;

said rotor has a long axis that is defined to align with said first end and said second end;

and further wherein when gas flows through said gas inlet port, it flows in a direction that is toward said pivot point and substantially aligned with said long axis of said rotor.

8. The apparatus of claim 7 wherein said chamber and said rotor collectively compose a first stage of a two-stage valve, and wherein said rotor selectively couples said gas inlet port to a second stage of said two-stage valve.

9. An apparatus comprising:

a chamber, wherein said chamber has a gas inlet port; and

a rotor, wherein:

said rotor is disposed within said chamber;

said rotor has a first end and a second end;

said rotor is positionable in a first position in which said first end blocks said gas inlet port to substantially prevent a first flow of gas from entering said chamber through said gas inlet port; and

said first end of said rotor does not contact a seating surface when it is in said first position.

10. The apparatus of claim 9 wherein said chamber further comprises a control volume port and a gas vent port, and further comprising:

a bore, wherein said bore is pneumatically coupled to said control volume port; and

a piston, wherein said piston is disposed in said bore; and wherein when said rotor is in said first position, said control volume port and said gas vent port are pneumatically coupled and said cylinder is depressurized.

11. The apparatus of claim 10 wherein said piston regulates a second flow of a gas into a nozzle, wherein said first flow of gas is less than 10 volume percent of said second flow of gas.

12. The apparatus of claim 10 wherein said rotor is positionable in a second position in which said second end blocks said gas vent port to substantially prevent gas from flowing out said gas vent port, and wherein when said rotor is in said second position, said gas inlet port and said control volume port are pneumatically coupled and said bore is pressurized.

13. The apparatus of claim 12 wherein when said rotor is in said first position, said piston is in a retracted position in said bore.

14. The apparatus of claim 12 wherein said rotor rotates about 10 degrees or less between said first position and said second position.

15. An apparatus comprising:

a chamber; and

a rotor, wherein said rotor is disposed within said chamber and is movable to control a first flow of gas into said chamber, and wherein said rotor and chamber are dimensioned and configured such that when said rotor moves to control said first flow of gas, said rotor:

does not lift against a pressure load;

is substantially insensitive to pressure imbalances; and

is substantially insensitive to g-loads.

16. The apparatus of claim 15 wherein a direction of motion of said rotor is substantially perpendicular to a direction of said first flow of said gas into said chamber.

17. The apparatus of claim 15 further comprising a bore, wherein said chamber is pneumatically coupled to said bore.

18. The apparatus of claim 17 further comprising a piston, wherein said piston is disposed in said bore, and further wherein said piston is movable between a first position and a second position.

19. The apparatus of claim 18 wherein in a first position of said rotor, said rotor couples said first flow of gas to said bore, causing said piston to move to said first position.

20. The apparatus of claim 19 wherein in a second position of said rotor, said rotor de-couples said first flow of gas from said bore, causing said piston to move to said second position.

21. The apparatus of claim 19 further comprising a nozzle, wherein when said piston is in said first position, said piston blocks a second flow of gas into said nozzle.

22. The apparatus of claim 21 wherein when said piston is in said second position, said second flow of gas enters said nozzle.

23. The apparatus of claim 22 wherein said first flow of gas is withdrawn from said second flow of gas and is less than ten volume percent of said second flow of gas.

24. An apparatus comprising:

a chamber, wherein said chamber has an inlet port, and control volume port and a vent port; and

a rotor, wherein:

said rotor is disposed within said chamber;

said rotor has a first end and a second end;

said rotor pivots less than about 10 degrees between a first position and a second position;

in said first position, said second end of said rotor blocks said vent port and pneumatically couples said inlet port and said control volume port; and

in said second position, said first end of said rotor blocks said inlet port and pneumatically couples said control volume port and said vent port.

25. An apparatus comprising:

a second stage valve for controlling a first flow of gas, wherein said second stage valve is pneumatically actuated by a first stage valve; and

said first stage valve, wherein said first stage valve comprises:

a chamber, wherein said chamber has a gas inlet port and control a volume port, and further wherein said control volume port couples to said second stage valve; and

a rotor, wherein:

said rotor is disposed within said chamber;

said rotor has a pivot point and a first end;

said rotor rotates about said pivot point in a direction that is substantially perpendicular to a second flow of gas that flows through said gas inlet port; and

said rotor selectively couples said gas inlet port to said control volume port.

26. A propulsion system comprising:

a solid-fuel gas generator;

a nozzle through which a flow of gas generated by said solid-fuel gas generator is exhausted;

a two-stage valve for controlling said flow of gas into said nozzle, wherein said two-stage valve comprises:

a second stage, wherein said second stage controls said flow of gas into said nozzle, wherein said second stage valve is pneumatically actuated by a first stage; and

said first stage, wherein said first stage comprises:

a chamber, wherein said chamber has a gas inlet port and a control volume port, and further wherein said control volume port couples to said second stage; and

a rotor, wherein:

said rotor is disposed within said chamber;

said rotor has a pivot point and a first end;

said rotor rotates about said pivot point in a direction that is substantially perpendicular to a second flow of gas that flows through said gas inlet port; and

said rotor selectively couples said gas inlet port to said control volume port.

27. A method comprising:

providing a first flow of gas;

withdrawing a portion of said first flow of gas, thereby creating a second flow of gas; and

controlling said first flow of gas via movement of a first valve element, wherein said movement of said first valve element is effected by enlarging or contracting a control volume by rotating a second valve element wherein:

said second valve element selectively pneumatically couples or decouples said control volume with said second flow of gas.

28. The method of claim 27 wherein at an initial point of contact between said second flow of gas and said second valve element, a direction of rotation of said second valve element is substantially perpendicular to said second flow of gas.

29. The method of claim 27 wherein said movement of said first valve element is linear and oscillatory.

30. The method of claim 27 wherein said movement of said second valve element is rotary and oscillatory.

31. The method of claim 27 wherein said second valve element rotates through an angle of about 10 degrees or less during selective pneumatic coupling and decoupling of said control volume with said second flow of gas.

32. The method of claim 27 wherein the rotation of said second valve element is electromagnetically actuated.

33. The method of claim 31 wherein the electromagnet actuation of said second valve element is pneumatically assisted.